PTU Series Ultrahigh-Purity Pressure Transducers

User's Manual

The Swagelok® PTU series pressure transducer provides electronic monitoring of system pressure for ultrahigh-purity applications. The PTU series transducer is available with a variety of pressure ranges, process connections, electrical connections, and output signals.

A Swagelok PTU series transducer will require mechanical and electrical installation; additionally, a set-up and/or adjustment procedure may be required to prepare the unit for service. This manual is intended to provide the instructions necessary to install, start-up, and troubleshoot the product.

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Safety Definitions

Potential danger to life or of serious injuries.

Potential danger to life or of serious injuries due to catapulting parts.

Potential danger of burns due to hot surfaces.

Notice, important information.

The product complies with the applicable European directives.

Safety Instructions

Do not connect the transducer to hazardous voltage.

Use qualified personnel to install the transducer.

Do not exceed the overpressure rating.

Safety Instructions

Before servicing any installed pressure transducer you must
- **depressurize system**
- **purge the transducer**

Residual material may be left in the transducer and system.

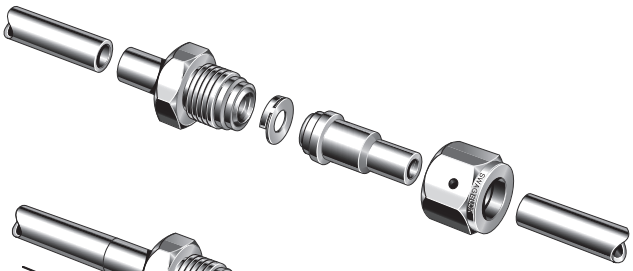
Safe Product Use

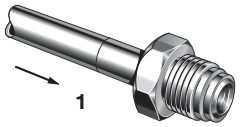
Follow any enclosed instructions and refer to the product catalog for detailed product information. When using a transducer, the total system design must be considered to ensure safe, trouble-free performance. Function, material compatibility, adequate ratings, proper installation, operation, and maintenance are the responsibilities of the system designer and user. **Improper selection or misuse of the product may result in serious personal injury or property damage**.

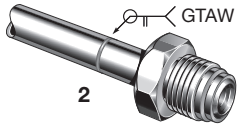
VCR Fitting Installation

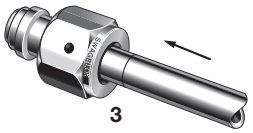
Warning **Swagelok VCR face seal fitting end connections with fixed threads must remain stationary during installation. Do not allow the sealing beads to rotate against the gasket.**

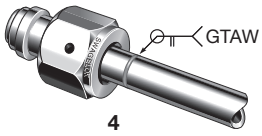
Warning **Over tightening will damage the sealing beads and may cause leakage.**

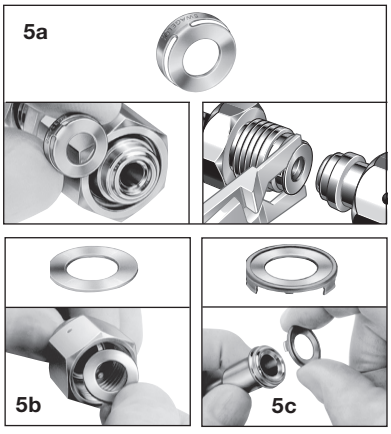


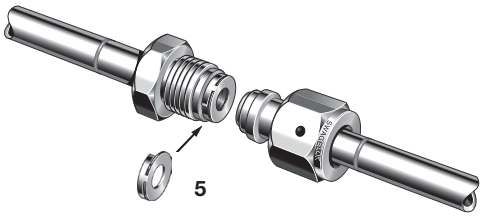


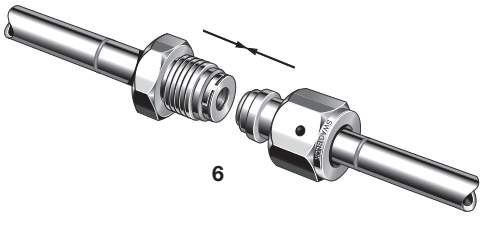


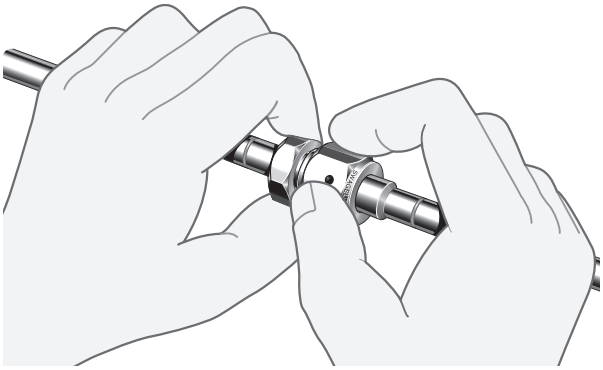




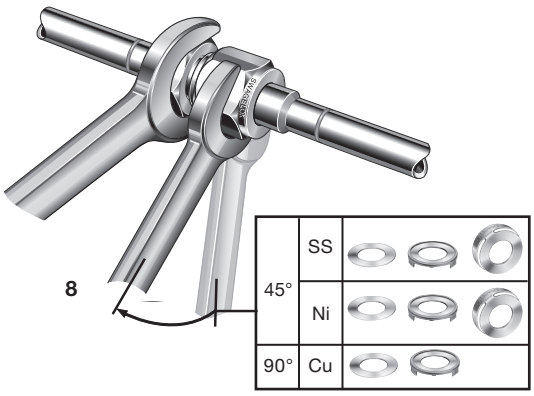








7 Finger-tight



Welding Precautions

Warning **Qualified personnel should perform the welding (GTAW).**

- Disconnect the transducer from any electrical device.
- Do not let the leads from the flying lead touch a metal surface during welding.
- Keep heat to the transducer to a minimum.

Electrical Installation

Do not exceed the max. permissible power supply DC 30 V.

Power must be turned off before disconnecting.

The Swagelok PTU series transducer is designed to operate with an unregulated input voltage of 10 < V dc < 30 (14 to 30 V with output signal 0.1 to 10.1 V). The exact operating input voltage is controlled by the load resistance (R_L).

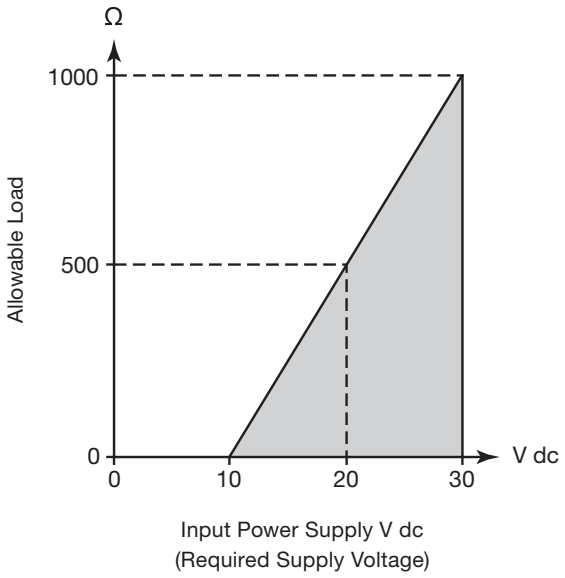
Output signal and allowed load

Transducer Output Type	Input Power V dc	Allowable Load R_L
0.1 to 5.1 V dc	10 to 30	> 5 K Ω
0.1 to 10.1 V dc	14 to 30	> 10 K Ω
4 to 20 mA	Max 30 V dc (0.02 R_L + 10 ≤ V dc) (0.02 R_L + 16 ≤ V dc)①	See graph

① Use this load equation when a PTU series digital display indicator is used.

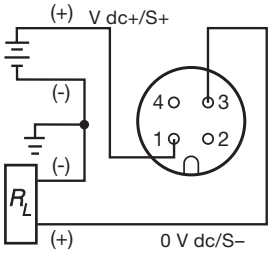
Current for external display or evaluation equipment can be supplied directly from the circuit when operating a transducer with current output. The Swagelok PTU series digital display indicator has a specific voltage drop of 6 V. This voltage drop must be considered when using the digital display indicator; see table above. If using another display, a voltage drop specific to that display must be considered.

Required Input Voltage for Current (4 to 20 mA) Output Transducers

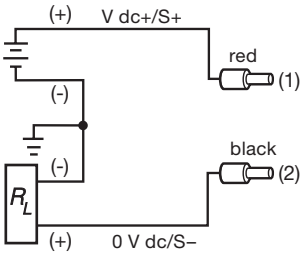


2-wire system, current output transducers

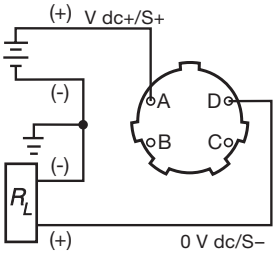
M 12 × 1, 4 pin Circular connector



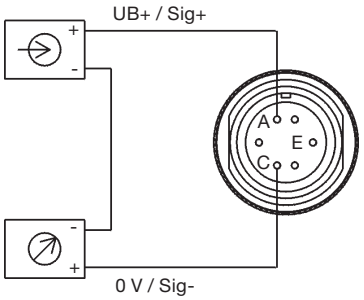
Direct wire, flying leads



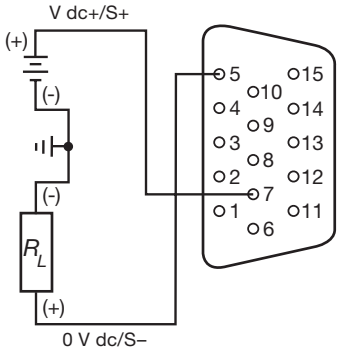
Bendix, 4 pin MIL plug



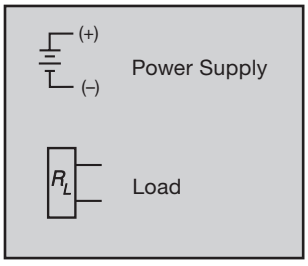
Tajimi Circular Connector R03-R6F



15 pin Sub-D



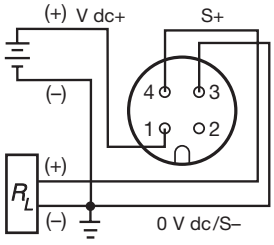
Legend



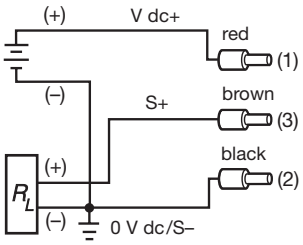
NOTE: Pin 5 and pin 12 are bridged internally in the sub-D connector.

3-wire system, voltage output transducers

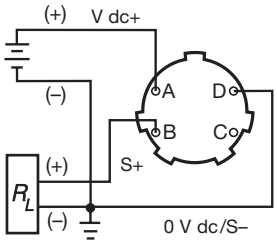
M 12 × 1, 4 pin
Circular connector



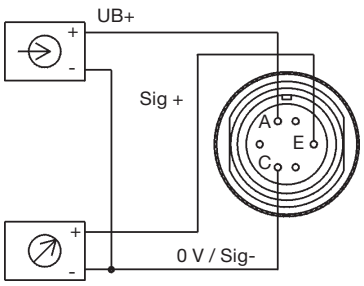
Direct wire,
flying leads



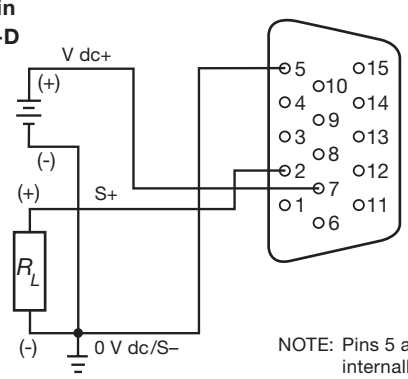
Bendix, 4 pin
MIL plug



Tajimi Circular
Connector R03-R6F

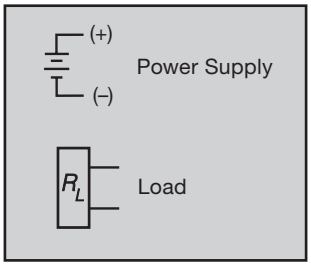


15 pin
Sub-D



NOTE: Pins 5 and 12 are internally connected

Legend



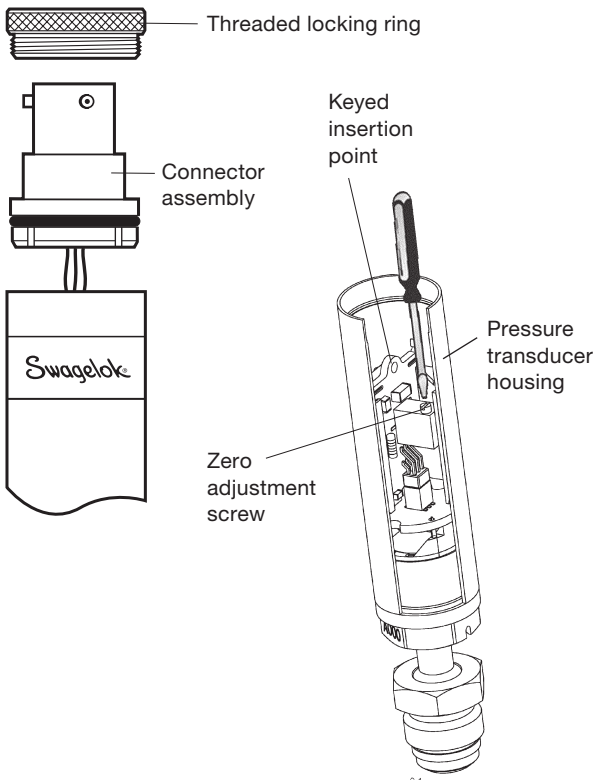
Zero Adjustment

The Swagelok PTU series transducer is factory calibrated and does not normally need field adjustment.

The surfaces of the pressure transducer may get hot during operation.

Span adjustment is not necessary after zero point correction.

For verification and adjustment of the zero point, depressurize the system to 0 psig (0 bar, 0 MPa) for gauge reference transducers. The potentiometer for the zero adjustment is protected inside the transducer housing. Use a 0.040 to 0.060 in. (1 to 1.5 mm) jeweler's screwdriver for adjustment.

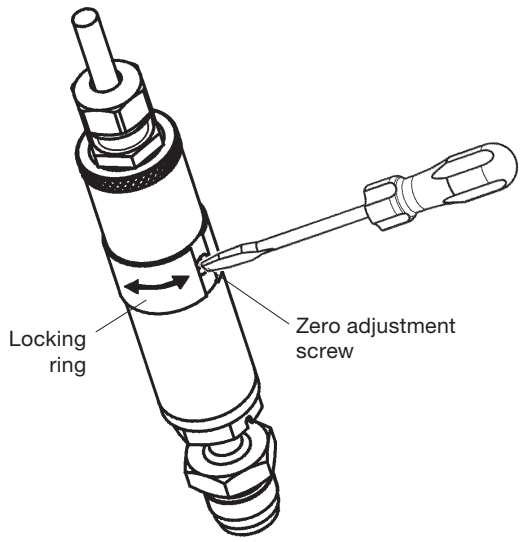


Procedure for Transducer with Top Access

1. Remove power to the transducer.
2. Remove the threaded locking ring on the top of transducer and gently extend the electrical connection to expose the zero adjustment screw.
3. Carefully pull the connector assembly out of the transducer housing as far as the internal connector cable will allow.
4. Restore power to the transducer.
5. Ensure the system is at 0 psig (0 bar, 0 MPa).
6. Monitor the output signal, and adjust the zero screw to 4 mA or 0.1 V depending on the signal output. Turn the zero adjustment screw in a clockwise direction to increase the signal or in a counterclockwise direction to decrease the signal.
7. Remove power to the transducer again.
8. Rotate the connector assembly on the transducer housing to the keyed insertion point.
9. Replace and hand tighten the locking ring on the top of transducer to close access to the zero adjustment screws.

Procedure for Transducer with Side Access

1. Turn the locking ring until the zero adjustment screw is exposed.
2. Ensure the system is at 0 psig (0 bar, 0 MPa).
3. Monitor the output signal, and adjust the zero adjustment screw to 4 mA or 0.1 V depending on the signal output. Turn the zero adjustment screw in a clockwise direction to increase the signal or in a counterclockwise direction to decrease the signal. Do not allow the screwdriver to contact any other part of the transducer.
4. Turn the locking ring until access to the zero adjustment screw is closed.



Electronic Board Replacement

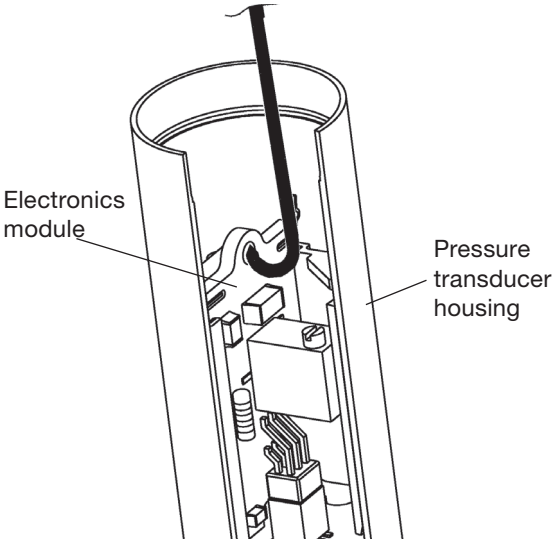
For module replacement, depressurize the system to 0 psig (0 bar, 0 MPa). Remove all power to the transducer.

Disassembly

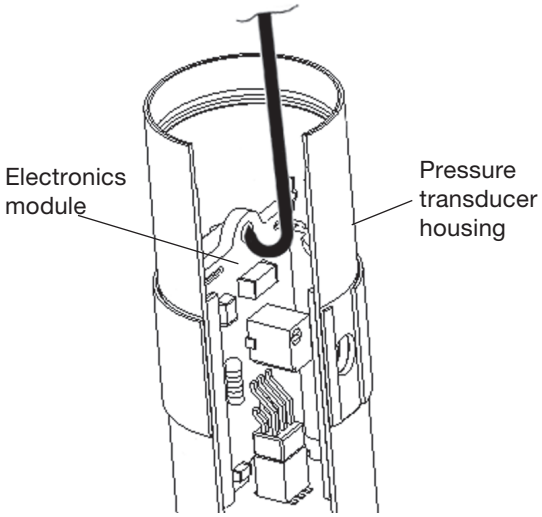
1. Use an appropriate grounding strap to protect the printed circuit module (PCB) and other electrical devices from voltage or static discharge to prevent possible damage.
2. Remove the locking ring on the top of transducer.
3. Carefully pull the connector assembly out of the transducer housing, as far as the internal connector cable will allow.
4. Remove the pin connector from the electronics module assembly.
5. Hook the electronics module with the provided removal tool.
6. While firmly holding the transducer housing, use the removal tool to pull the electronics module assembly straight out of the transducer housing assembly.

Reassembly

1. Align the new electronic module with the slots in the plastic alignment ring inside the transducer housing.
2. Firmly push the new electronics module assembly into the transducer body as far as it will go.
3. Align the pins on the connector from the electrical connector with the sockets on the new electronic module assembly.
4. Rotate the connector assembly on the transducer housing to the keyed insertion point.
5. Replace and hand tighten the locking ring on the top of transducer.
6. Restore power to the transducer and verify the zero point.



Transducer with Top Access



Transducer with Side Access

Troubleshooting Guide

Warning

Before servicing any installed pressure transducer, you must
- **depressurize the system**
- **purge the transducer**

Residual material may be left in the transducer and system.

Warning

- **If the transducer becomes damaged or unsafe for operation, remove it from service and mark to prevent it from being used accidentally.**
- **Have repairs performed by the manufacturer only.**

Do not insert any pointed or hard objects into the pressure port for cleaning.

Problem	Possible Causes	Remedy
No signal output	Failure of power supply	Check power supply and wiring
	Wiring interrupted	Replace defective components
	Transducer miswired	Check wiring
	Defective electronics	Change electronics module
Steady signal despite pressure variation	Defective electronics	Change electronics module
	Transducer failure through over-pressurization	Replace transducer
Steady, elevated signal despite pressure variation	Defective electronics	Change electronics module
Full span reading too low	Supply voltage too low	Adjust supply voltage
	Load impedance too high	Adjust supply voltage (See **Output signal and allowed load** table in Section 4)
Zero signal too low	Zero adjustment made incorrectly	Adjust zero point
Zero signal too high	Zero adjustment made incorrectly	Adjust zero point
	Transducer failure through over-pressurization	Replace transducer
Non-linear signal output despite correct zero adjustment	Transducer failure through over-pressurization	Replace transducer

Storage and Disposal

Warning

Purge all media from the pressure transducer before storage or disposal of the transducer.

Mount the protection cap when storing the transducer.

Dispose of transducer components and packaging materials in accordance with the respective waste treatment and disposal regulations of the region or country to which the transducer is supplied.

Do not mix or interchange parts with those of other manufacturers.

For product technical data, including materials of construction, see the *Swagelok® Pressure Transducers, Ultrahigh-Purity* catalog, MS-02-162.

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